

**SEMI-ANNUAL GROUNDWATER MONITORING REPORT  
THIRD AND FOURTH QUARTERS 2004  
Presidio of San Francisco, California**

**E.1 EXECUTIVE SUMMARY**

The Presidio-Wide Quarterly Groundwater Monitoring Program continued, with modifications, during the Third and Fourth Quarters 2004. Sampling occurred during the second full week of August and the second and third weeks of December 2004. This executive summary serves as a semi-annual summary of the groundwater monitoring program at the Presidio for the second half of 2004.

**E.1.1 Changes to the Quarterly Groundwater Monitoring Program, Third and Fourth Quarters 2004**

Several modifications to the Presidio-wide Quarterly Monitoring Program were implemented during the Third and Fourth Quarters 2004. The majority of the changes were associated with removal of sites from the program, reductions in sampling frequency at sites with decision documents in place and additions of analytes associated with arsenic contamination at the Commissary/PX Area. All changes approved for the Third and Fourth Quarters 2004 are summarized below and are detailed in Tables 1A and 1B, respectively.

**E.1.1.1 Third Quarter 2004**

The sampling method for Commissary/PX Area monitoring wells 600GW101, 600GW105, 600GW106, 600GW108, and 610GW101 through 610GW103 were changed to low flow in order to collect ORP measurements in the field with a flow cell. This change to Table 1A was completed following the submission of this table to the stakeholders.

Three sites (DEH Area, Building 637 Area and Graded Area 9), which were previously reported in the *Presidio-wide Groundwater Monitoring Report, First and Second Quarters 2004* were removed from this Presidio-wide Groundwater Monitoring Report. A discussion of the sites removed is included below.

**DEH Area**

The DEH Area (formerly Section A-3) is no longer monitored or sampled as part of the Presidio-wide Groundwater Monitoring Program. The requirements of the DEH RAP have been met and TCE has not been detected above the MCL of 5.0 µg/L within any DEH Area monitoring wells since August 2002.

The Trust provided DTSC with a copy of *Technical Report: First Quarter 2004 Groundwater Monitoring Data at the Directorate of Engineering and Housing (DEH) Area Operable Unit, Presidio of San Francisco* dated July 2004 (Technical Report). The Technical Report presents the results of the groundwater monitoring activities conducted as part of the First Quarter 2004 Presidio-wide Quarterly Groundwater Monitoring Program at the DEH Operable Unit (OU) Area. The Technical Report constitutes an addendum to the *DEH Closure Report* (MACTEC, 2003c). The Closure Report was submitted by the Trust to DTSC in accordance with Section 5.1.2 of the Consent Agreement for the Presidio of San Francisco dated 30 August 1999 and signed by DTSC, the National Park Service (NPS), and the Trust (Consent Agreement). In a letter dated 22 July 2004, the Trust requested that the DEH OU Area be regulatorily certified as adequately remediated in accordance with Section 5.16 of the Consent Agreement.

Based on the analysis of current and historical groundwater analytical results, the DEH Area should be considered for final closure and certification (with no land or groundwater use restrictions) in accordance with the Consent Agreement. Upon DTSC certification of the DEH Area, all groundwater monitoring wells associated with the DEH Area will be abandoned in accordance with State of California requirements.

DEH Area monitoring wells are shown on Table 1A in blue text and are lined out. This change to Table 1A was completed following the submission of this table to the stakeholders.

### **Building 637 Area**

The Building 637 Area (formerly Section A-5) is no longer monitored or sampled as part of the Presidio-wide Groundwater Monitoring Program. Per the approved Building 637 CAP, the required number of sampling events has been met and sampling of the 13 Building 637 Area wells has ceased. The *Building 637 CAP Closure Report* was submitted to the stakeholders for approval in April 2004. The Building 637 Area wells will be properly abandoned following approval of the Closure Report.

Building 637 Area monitoring wells are shown on Table 1A in blue text and are lined out. This change to Table 1A was completed following the submission of this table to the stakeholders.

### **Graded Area 9**

Graded Area 9 (formerly Section A-17) is no longer monitored or sampled as part of the Presidio-wide Groundwater Monitoring Program. Graded Area 9 wells were either dry or contained insufficient water for sampling throughout 2002, 2003, and 2004. Based on the lack of groundwater observed within all the Graded Area 9 monitoring wells since 2002, the wells were abandoned on 14 July 2004 during the Third Quarter 2004, in accordance with procedures outlined in the FSP (Treadwell & Rollo, 2001a).

### **Analytical Additions and Reductions**

The following changes were approved and implemented during the Third Quarter 2004, as detailed in Table 1A.

- General chemistry parameters, iron, and sulfide analyses were added to select Commissary/PX Area monitoring wells and seeps to further evaluate the current redox state of groundwater.
- All Nike Missile Facility monitoring wells (NKGW01 through NKGW05) were sampled for NDMA.
- Two temporary piezometers were abandoned at from the Baker Beach Disturbed Area 3 in preparation for the remedial action.
- Two wells were added to the Building 1065 Area (1065MW101 and 1065MW102). These wells were analyzed for dissolved metals, dissolved oxygen, VOCs, and TPH.

#### **E.1.1.2 Fourth Quarter 2004**

Four fixed water monitoring points (BB3SW100 through BB3SW103) were installed at Baker Beach Disturbed Area 3 prior to the Fourth Quarter 2004 as part of the Baker Beach Disturbed Area 3 remedial action. The identification of fixed water monitoring point BB3SW103 was subsequently changed to BB3PZ101 in order to be more consistent with its construction (Table 1B). This change was made to Table 1B following the submission of this table to the stakeholders and is illustrated in blue text.

### **Analytical Additions and Reductions**

The following changes were approved and implemented during the Fourth Quarter 2004, as detailed in Table 1B.

- The sampling frequency for PCBs, VOCs, PAHs, and chlorinated herbicides within Fill Site 5 monitoring wells was reduced to semi-annual, in accordance with the Fill Site 5 RAP.
- The sampling frequency for OCPs, PCBs, chlorinated herbicides, and TPH within Landfill 4 monitoring wells was reduced to semi-annual, in accordance with the Landfill 4 RAP.
- Dissolved gases (consisting of ethane, ethene, and methane), TOC, arsenic (As III and As V) speciation, iron, and manganese were added to select monitoring locations at the Commissary/PX Area to further evaluate the current redox state of groundwater.
- Two groundwater monitoring wells, one piezometer and three fixed monitoring points were added to the Baker Beach Disturbed Area 3 groundwater monitoring plan, in accordance with the Baker Beach Disturbed Area 3 RAP. Samples from these were

analyzed for general chemistry parameters, dissolved and total metals, TDS, dissolved oxygen, and TPH.

- Dissolved metals analysis was added to Building 1065 Area monitoring wells and piezometers (1065PZ1A, 1065PZ1B, 1065PZ2A, 1065PZ9A, 1065PZ9B, 1065MW101 and 1065MW102).

### **E.1.2 Significant Observations and Accomplishments in Third and Fourth Quarters 2004**

Significant changes or trends in groundwater characteristics and chemistry as well as significant site-specific milestones are discussed below. Changes to proposed site-specific sampling schedules are discussed in the site-specific sections of Appendix A.

#### **E.1.2.1 Building 900s Area (Appendix A-1)**

Groundwater elevations, gradients, and flow directions during Third and Fourth Quarters 2004 are consistent with historical values and interpretations.

The sampling frequency at the Building 900s Area has been reduced to annual, during the First Quarter, and will continue per the Crissy Field RAP. The first five-year review will be completed in 2007.

#### **E.1.2.2 Landfill 8 (Appendix A-2)**

Groundwater elevations, gradients, and flow directions during Third and Fourth Quarters 2004 are consistent with historical values and interpretations. No significant trends or observations were identified at Landfill 8 during the Third or Fourth Quarters 2004.

The sampling frequency at Landfill 8 has been reduced to annual, until the Landfill 8 RAP has been finalized, at which point sampling will be performed per the Landfill 8 RAP.

#### **E.1.2.3 Fill Site 6 (Appendix A-3)**

Groundwater elevations, gradients, and flow directions are consistent with historical values and interpretations. No significant trends or observations were identified at Fill Site 6 during the Third or Fourth Quarters 2004.

Several new highs in dissolved metals, including an exceedance of thallium at monitoring well LF6GW102, occurred during the Third or Fourth Quarters 2004. Future metals detections and trends will continue to be monitored and evaluated, until this monitoring well is removed for the Fill Site 6A remedial action. No other significant observations or trends were identified during either the Third or Fourth Quarters 2004.

In preparation for the Fill Site 6A remedial action, monitoring well LF6GW102 will be abandoned. Additional monitoring wells will be installed and quarterly sampling conducted following the remedial excavation activities in accordance with the RAP.

#### **E.1.2.4 Battery Howe/Wagner (Appendix A-4)**

Groundwater elevations, gradients, and flow directions during Third and Fourth Quarters 2004 are consistent with historical values and interpretations.

Annual groundwater monitoring is scheduled to continue within Battery Howe/Wagner Area monitoring wells during 2005.

#### **E.1.2.5 Building 1349 Area (Appendix A-5)**

Four Building 1349 monitoring wells were sampled during the Third Quarter 2004 and five wells were sampled during the Fourth Quarter 2004.

The Draft Building 1349 Study Area CAP was submitted to the stakeholders in March 2005 and is currently under regulatory review. Groundwater sampling at the Building 1349 Area will be conducted in accordance with the Draft CAP when the CAP is finalized. The recommended corrective actions for the Building 1349 Area will be presented in this report when the CAP is approved by the stakeholders.

TPHg and TPHd were detected above their respective Building 1349 Area Draft CAP cleanup levels during both the Third or Fourth Quarters 2004. Of the monitoring wells sampled, monitoring well 1349MW100 continues to be the only site well reporting TPH concentrations in excess of groundwater cleanup levels.

Several OCPs continue to be detected within 1349MW100 samples. Nine of the ten OCPs detected within 1349MW100 during the Third Quarter 2004 had concentrations in excess of their Draft CAP-specified cleanup levels. OCPs will continue to be evaluated as part of the Building 1349 Area CAP. No OCPs were detected within 1349MW100 during the Fourth Quarter 2004, however, the reporting limits for all OCPs during the Fourth Quarter 2004 within this sample were elevated because the laboratory diluted the sample because of high levels of non-target analytes were present.

Monitoring wells 1349MW01, 1349MW02, 1349MW03R, 1349MW101, 1349MW102, 1349MW103 and 1349MW105 have had Building 1349 CAP or Fill Site 5 RAP cleanup level exceedances in previous quarters. Building 1349 Area monitoring wells located in Fill Site 5 will continue to be sampled in accordance with the Fill Site 5 RAP and Fill Site 5 cleanup levels will continue to be applied. Groundwater results from Building 1349 Area monitoring wells located upgradient of Fill Site 5 will continue to have Building 1349 Area CAP cleanup levels applied.

Dissolved arsenic, iron, and manganese have been detected within monitoring well 1349MW100 samples at concentrations generally higher than within the other Building 1349 monitoring wells. Additionally, the concentrations of these dissolved metals have generally been increasing over time at this well. Arsenic is commonly found in the natural environment and is often present in combination with iron and manganese oxides.

Arsenic, iron and manganese are generally more soluble and mobile under reducing conditions. A reducing environment likely exists within 1349MW100 due to the degradation of petroleum hydrocarbons present at this well. This chemical process is likely contributing to the elevated levels of dissolved arsenic, iron and manganese within 1349MW100. Future detections and trends of these compounds will continue to be monitored and evaluated.

No other significant observations or trends were identified during the Third or Fourth Quarters 2004.

#### **E.1.2.6      Fill Site 1, Landfill 2, El Polin Spring, Tennessee Hollow, And Upgradient Wells (Appendix A-6)**

No significant trends were observed during the Third and Fourth Quarters 2004. The sampling frequency at Fill Site 1 and Landfill 2 has been reduced to annual until a monitoring plan is established or until the sites have undergone clean closure (Tables 1A and 1B). Due to four consecutive quarters of non-detect results, monitoring wells 100GW101 and 104GW101 were removed from the sampling schedule following the First Quarter 2004. Abandonment of these wells will be proposed in the pending Group II Mini-CAP document.

Annual analysis of 22 dissolved metals will continue to be conducted at El Polin Spring for the purpose of comparing surface water analytical results to nearby groundwater results and evaluating the potential for human health risk exposure. Monitoring of TDS, dissolved oxygen, and cyanide will be conducted quarterly at El Polin Spring in order to evaluate the potential for human health risk exposure and to ensure that potential changes in water chemistry are identified in a timely manner. No additional changes to the groundwater monitoring program are proposed at this site.

#### **E.1.2.7      Landfill E (Appendix A-7)**

Groundwater elevations, gradients, and flow directions are consistent with historical values and interpretations. No significant trends or observations were identified at Landfill E during the Third and Fourth Quarters 2004.

There are no proposed changes to the quarterly monitoring procedures at this site.

#### **E.1.2.8 Landfill 4 (Appendix A-8)**

The Third and Fourth Quarters 2004 represent the seventh and eighth groundwater sampling events for LF 4 monitoring wells LF4GW102 through LF4GW106. Monitoring wells LF04GW03, LF4GW100 and LF4GW101 continue to be dry or to contain insufficient water for sampling and therefore, no groundwater samples were collected from these wells during the Third or Fourth Quarters 2004.

General chemistry parameters at the site have remained relatively stable, though clear trends are not yet apparent for all wells.

TPHfo was detected at LF4 for the first time in well LF4GW106 at a concentration of 490 µg/L. No TPH compounds have ever been detected above RAP-specified cleanup levels within LF 4 monitoring wells.

No PAHs were detected within any LF 4 monitoring wells during the Third or Fourth Quarters 2004. Low concentrations of fluoranthene and/or phenanthrene were detected in groundwater from LF4GW102 during the Third and Fourth Quarters 2003. PAHs have never been detected above RAP-specified cleanup levels.

Chlorinated herbicides and PCBs have never been detected in any LF 4 groundwater samples.

No OCPs were detected within any LF 4 monitoring wells during the Third Quarter 2004. Beta-BHC was detected within LF4GW102 during the First and Second Quarters 2003, but has not been detected since. Future OCP results within LF 4 monitoring wells will continue to be monitored, in accordance with the RAP.

Dissolved metals concentrations at the site have remained relatively stable, though clear trends are not yet apparent for all wells. The potential for increasing or decreasing dissolved metals concentration trends at the site will continue to be evaluated in future monitoring events, in accordance with the RAP.

No RAP-specified cleanup levels have been exceeded within LF 4 monitoring well samples to date. No significant trends were observed in the samples collected during the Third or Fourth Quarters 2004. The five monitoring wells installed as part of the LF 4 RAP will continue to be sampled as part of the Presidio Quarterly Groundwater Monitoring Program, in accordance with the RAP. Monitoring wells LF04GW03, LF4GW100, and LF4GW101 will continue to be monitored for groundwater elevation and will be sampled if sufficient water is present.

Proposed changes to the groundwater monitoring program at this site include the reduction of TPH, OCP, PCB, and chlorinated herbicide analyses to semi-annual sampling. If no RAP-specified cleanup levels are exceeded, all other analyses will be reduced to semi-annual sampling following the First Quarter 2005.

#### **E.1.2.9          Fill Site 5 (Appendix A-9)**

No TPH, VOCs, PCBs, PAHs or chlorinated herbicides were detected above their respective RAP-specified cleanup levels within any FS 5 or associated Building 1349 Area monitoring wells during the Third or Fourth Quarters 2004. Compounds detected above RAP-specified cleanup levels are discussed below.

Several TPH and OCP compounds were detected in the upgradient Building 1349 monitoring well 1349MW100 samples during the Third and Fourth Quarters 2004. FS 5 RAP cleanup levels do not apply to upgradient Building 1349 monitoring wells.

Groundwater monitoring is scheduled to continue on a quarterly basis within FS 5 and associated Building 1349 Area monitoring wells, in accordance with the FS 5 RAP. Proposed changes to the groundwater monitoring program at this site include the reduction of VOC, PAHs, PCB, and chlorinated herbicides analyses to semi-annual. Per the RAP, analytical frequency will be reduced to semi-annual for each analyte that is not detected above cleanup levels for four consecutive quarters (Treadwell & Rollo, 2002e).

#### **E.1.2.10        Building 231/207 Area (Appendix A-10)**

Building 231/207 Area monitoring well 231MW09 was purged and sampled during the Third and Fourth Quarter 2004 sampling events. It was the only Building 231/207 monitoring well scheduled for sampling during these events. No TPH or VOC compounds were detected at or above the laboratory reporting limit.

Concentrations of TPH and VOCs within Building 231/207 Area monitoring wells continue to fluctuate within historical bounds. Future concentrations of TPH and VOCs will be monitored within all Building 231/207 Area well/piezometer samples and new trends will be developed as they become apparent.

There are no proposed changes to the groundwater sampling schedule or procedures at this site.

#### **E.1.2.11        Building 1065/1027 Area (Appendix A-11)**

MTBE continues to be sporadically detected at low levels within some piezometer samples at the Building 1065 Area. A review of MTBE data and geographic distribution at the Building 1065/1027 Area does not reveal clear trends in MTBE concentration or geographic distribution. MTBE groundwater detections at the Building 1065 Area may be caused by environmental factors such as runoff and the use of internal combustion engines, and do not appear to represent a significant impact to groundwater.

The presence of BTEX compounds and TPH within shallow piezometer 1065PZ1A during the Third Quarter 2004, and the lack of significant BTEX compounds and TPHg within the associated intermediate monitoring wells and piezometers suggests that BTEX and TPH impacts

are limited to this small isolated area within the shallow zone. Additionally, the absence of TPHg within piezometer 1065PZ1A during the Fourth Quarter 2004 is significant because this is the first time TPHg has not been detected within this piezometer. The absence of TPHg within 1065PZ1A may be a function of the interim removal action that took place upgradient of 1065PZ1A in November 2003.

Potential changes to the groundwater flow patterns and any potential impact to contaminant migration will continue to be evaluated in future quarterly monitoring events.

Groundwater sampling frequency was reduced to annual within all Building 1065/1027 Area wells and piezometers, except 1065PZ1A, 1065PZ1B, 1065PZ2A, 1065PZ4A, 1065PZ5AR, 1065MW9A, 1065MW9B, 1065MW101, 1065MW102, and 1047MW101 until the Building 1065/1027 Area CAP is implemented, at which time the groundwater monitoring program will be conducted in accordance with the CAP.

#### **E.1.2.12 Building 215 (Appendix A-12)**

Groundwater elevations, gradients, and flow directions during Third and Fourth Quarters 2004 are consistent with historical values and interpretations.

The RWQCB has concurred with the *No Further Action* recommendation for this site, as stated in the RWQCB's letter to the Trust entitled *Subject: Concurrence on Recommendation for No Further Action for Petroleum Constituents Detected within the Building 215 Area, Presidio of San Francisco*. The Building 215 Area is currently scheduled to be removed from the Presidio-wide Groundwater Monitoring Program.

#### **E.1.2.13 Nike Missile Facility (Appendix A-13)**

Groundwater elevations, gradients, and flow directions during the Third and Fourth Quarters 2004 are consistent with historical values and interpretations. NDMA was detected above laboratory limits within Nike Missile Facility monitoring wells NKGW01, NKGW04 and NKGW05 during the Third Quarter 2004, however, none of the detected concentrations exceeded the EPA's PRG for tap water or the CDHS notification level (formerly action level).

NDMA will continue to be sampled within all Nike Missile Facility monitoring wells during the first and third quarter sampling events to establish a baseline of data. A RAP is currently being prepared for the Nike Missile Facility and a revised groundwater monitoring plan will be implemented, in accordance with the RAP, when it is approved by the DTSC, RWQCB, and other stakeholders. There are no other proposed changes to the groundwater monitoring program at this site.

#### **E.1.2.14 Baker Beach Disturbed Area 3 (Appendix A-14)**

Both BBDA 3 temporary piezometers were abandoned following the Second Quarter 2004, prior to commencement of remedial construction activities. No groundwater monitoring activities took place at BBDA 3 during the Third Quarter 2004 because the remedial action was in progress and no groundwater monitoring wells, seep monitoring locations had yet been established. Following the excavation activities, two groundwater monitoring wells and four seep monitoring points (one piezometer and three fixed water sampling locations) were installed and included in the Presidio-wide Groundwater Monitoring Program. Due to limited data collected to date, no significant trends were identified during the Fourth Quarter 2004 at BBDA 3. Future detections and trends will continue to be monitored and evaluated in accordance with the RAP.

During future monitoring events the four seep monitoring points (one piezometer and three fixed water sampling locations) will be purged and sampled using the modified method to ensure that the water collected is not stagnant.

#### **E.1.2.15 Landfill 10 (Appendix A-15)**

MTBE was detected for the third time in monitoring well LF10GW100 during the Third Quarter 2004 at a concentration of 2.3 µg/L. However, clear trends in MTBE concentration or geographic distribution have not been identified and this detection may not represent an impact to groundwater from Landfill 10.

Total lead was detected at a concentration of 6.8 µg/L in surface water seep LF10SP01 during the Fourth Quarter 2004. Dissolved lead was not detected above the laboratory's reporting limit during the Fourth Quarter 2004. Sediment in the un-filtered sample likely contributed to the total lead concentrations which does not represent dissolved water quality conditions.

No other significant trends or observations were identified at Landfill 10 during the Third and Fourth Quarters 2004.

A Focused Feasibility Study (FFS) and a RAP are currently being prepared for Landfill 10 and are scheduled to be completed in Spring and Summer of 2005, respectively.

#### **E.1.2.16 Commissary/PX Area (Appendix A-16)**

Dissolved arsenic was not detected above the CAP-specified groundwater cleanup level of 10 µg/L within any Commissary/PX Area monitoring wells during the Third or Fourth Quarters 2004. Dissolved arsenic was detected above its CAP-specified cleanup level within seep 610SP01 during the Third Quarter 2004. Dissolved arsenic was also detected at a concentration equal to the cleanup level of 10 µg/L within 610GW103 during the Fourth Quarter 2004 in the sample collected on 21 December 2004. The dissolved arsenic concentration measured within

this well in the sample collected on 16 December 2004 was 5.1 µg/L, which is below the applicable cleanup level. No other dissolved metals were detected at concentrations exceeding CAP-specified cleanup levels during the Third or Fourth Quarters 2004.

Total metal concentrations in surface water seep samples 610SP01 and 610SP02 for the Third and/or Fourth Quarters 2004 exceed CAP-specified cleanup levels for arsenic, chromium, copper, lead, nickel, and zinc.

Arsenic speciation analysis was conducted for the first time at the site during the Fourth Quarter 2004. As discussed in Section A-16, the results of the arsenic speciation analysis indicate that a reducing environment is present in the area of the 610-series monitoring wells and seeps. Future arsenic speciation and other analyses associated with determining the groundwater redox potential are scheduled to continue at the Commissary/ PX Area. Concentration trends of these parameters will be monitored and changes in redox potential will be identified as they become apparent.

No PAHs, VOCs, MTBE, or TPH compounds were detected above their applicable cleanup levels during either the Third or Fourth Quarters 2004. No other significant findings or data trends were observed during either the Third or Fourth Quarters 2004.

The Draft Commissary/PX Area CAP was submitted to stakeholders for public review in July 2004 and is currently being revised. Several groundwater analyses were added to the Commissary/PX Area groundwater monitoring plan during the Fourth Quarter 2004 to further evaluate the site conditions. Groundwater monitoring will continue at the Commissary/PX Area in accordance with Table 1B until the CAP is finalized at which point groundwater monitoring will be conducted in accordance with the Final CAP.